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A Taxonomic Study of the Family Hesperiidae (Rhopalocera) of the Massif Mountains of Sharr, Pollog Valley and Mavrovo National Park

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Abstract
The research on Rhopalocera fauna in the massif mountains of Sharr, Pollogu Valley and Mavrovo National Park was explored several times years ago by different researchers, but this time we have considered to be explored again, but this time in the integrated territory, since this group requires a study dimension of more specific and characterized research on the possibility of finding a new species in this territory. Our research is carried out on 500 samples belonging to the Hesperiidae family. So far, through the keys were determined 18 species belonging to 7 Genus and 2 subfamilies. The samples were collected at 18 research stations of different heights above the sea level and different habitats. For each survey station data on habitat characteristics were recorded, altitude, latitude and longitude.
Keywords: Ropalocerofauna, Hesperiidae, distribution of species, Sharr Mountain, Macedonia.

Introduction

Sharr Mountain is the largest massif mountain in the Republic of Macedonia which is located in the northwestern part of Republic of Macedonia and which includes a length of 85 km, and a width of 15-20 km with an area of 1607 km². Sharr Mountain is located in a northern latitude 420 41'43" East and 200 34' 51" which begins with an elevation of 600 - up to 2747m, the highest peak is Titov VRV which interlocks a large number of different forest and grassy generations to the alpine zone. Sharr Mountain is one of the richest massifs, with subordinated types of Rhopalocera, Diurna (butterflies of the day) not only in Macedonia but also in the Balkan Peninsula.

Pollogu Valley is a low valley located at 380-550m above sea level and which lies between the Sharr Mountain and the Dry Skopje Mountain. It has almost a meridian stretch and its length is 44 km and width 7 km (West-East), with an area of 250 km2 that ranks immediately after the Pelagonija and Skopje. It is consisted of Tetova valley (Lower Polog) and the valley of Gostivar or Vardar (Upper Polog).

Mavrova National Park is a south integrated part of Sharr Massif Mountain at an altitude of 800-2100m above the sea level and it is characterized by a Rhopalocera fauna which requires a more detailed exploration for the eventuality of finding any new type. Rhopalocera fauna (Lepidoptera, Rhopalocera), in the function of which this study was undertaken, it presents scientific, practical and ecological interest. Dubbed else as "flying flowers" for the possession of stunning colors, these butterflies of the day constitute the most significant group of Lepidoptera, with nearly 174.250 species collected in 126 families. Today, the world recognizes at around 17,500 species of butterflies of the day (Rhopalocera, Diurna), while in Europe live at around 482 types and in the Republic of Macedonia live 201 types. If we account these 201% types in (%), it appears that 46% of the total European number are located in Macedonia and based on the area of the territory this is a very high percentage. This richness primarily is consisted by the presence of the two climates: Mediterranean and Continental in the Republic of Macedonia. For the Macedonian Lepidoptera fauna in total are recognized only three researchers. Austrians, Rebel & Dr. Dr.Hans. Zerny [14] and Josef Thurner [18] and researcher Scheider P., P. Jaksic [15], with co-author Krpaç[9]. In the latest edition of Krpaç et al., 2008 [10] are reported 201 species of Rhopalocera in the Republic of Macedonia. Until now there are recognized superficial fauna studies for Sharr massif Mountain Rhopalocera Fauna and its surroundings, D. Melovski [5]. In the research of all these authors, it is still left out space for the Rhopalocera fauna to be studied.

The material and the method

During this research it was studied the Hesperiidae family with over 500 exemplars that were met at research stations within the territory of the Sharr Massif Mountain, Pollogu Valley and in the National Park of Mavrovo, the latest is considered to be a continuity of Sharri Massif Mountain.

The collection of material is done through special entomological networking for the capture of these butterflies. Butterflies are caught during their flight or during their stay on the flowers, shrubs and spontaneous vegetation. All material is ticketed at the collection place with the data and place of its collection, date of collection, biotope and name of the collector; also with special notes for vegetation (grass, shrub, and tree). After capturing, the objects were set and preserved in envelopes and entomological mattresses. The material for the study was

collected from 18 stations for three years, within May - September of the calendar years 2011 to 2012 and 2013 in the northwestern territory of Republic of Macedonia. On the map of the country, this territory consists one tenth of the total territory of the Republic of Macedonia (Fig.1). In most stations were made several gatherings of the material in different months and different hours of the day. In these expeditions it was marked the violation of the most characteristic habitats as regards flora and height of the sea. At each survey stations were taken information on the characteristics of the habitat, altitude, geographic position in GPS and the date of collection of the fauna material.

The research work of almost two years has resulted in the collection of over 500 adult individuals (male and female) to Rhopalocera (Hesperiidae) which are saved in the scientific fund of the study program of Biology, the Department of Zoology of Mathematics and Natural Sciences Faculty of the State University of Tetova. The determinations were performed in science laboratory of Nature Science Museum in Skopje, with the help of stereomicroscope of the M5A Wild type (Vladimir T. Krpach), based on morphological characteristics used for the determination of the systematic units. At times, the accuracy of determination was also necessary to study their genitals to confirm the accuracy of determination. In this determination sub-species have not been taken into consideration. The number of copies that were taken into considerate for determination was above 5 in order to obtain more accurate information. In order to unify our results with the percentage of the Rhopalocera we were based on the new nomenclature [21]. Fauna Europaea (2010): Version 2.4., while their determination was based according to the authors [17]. Tolman T. & Levington 2012. Auflage (Europas und Die Schmetterlinge Nordwestafrikas. Stuttgart).

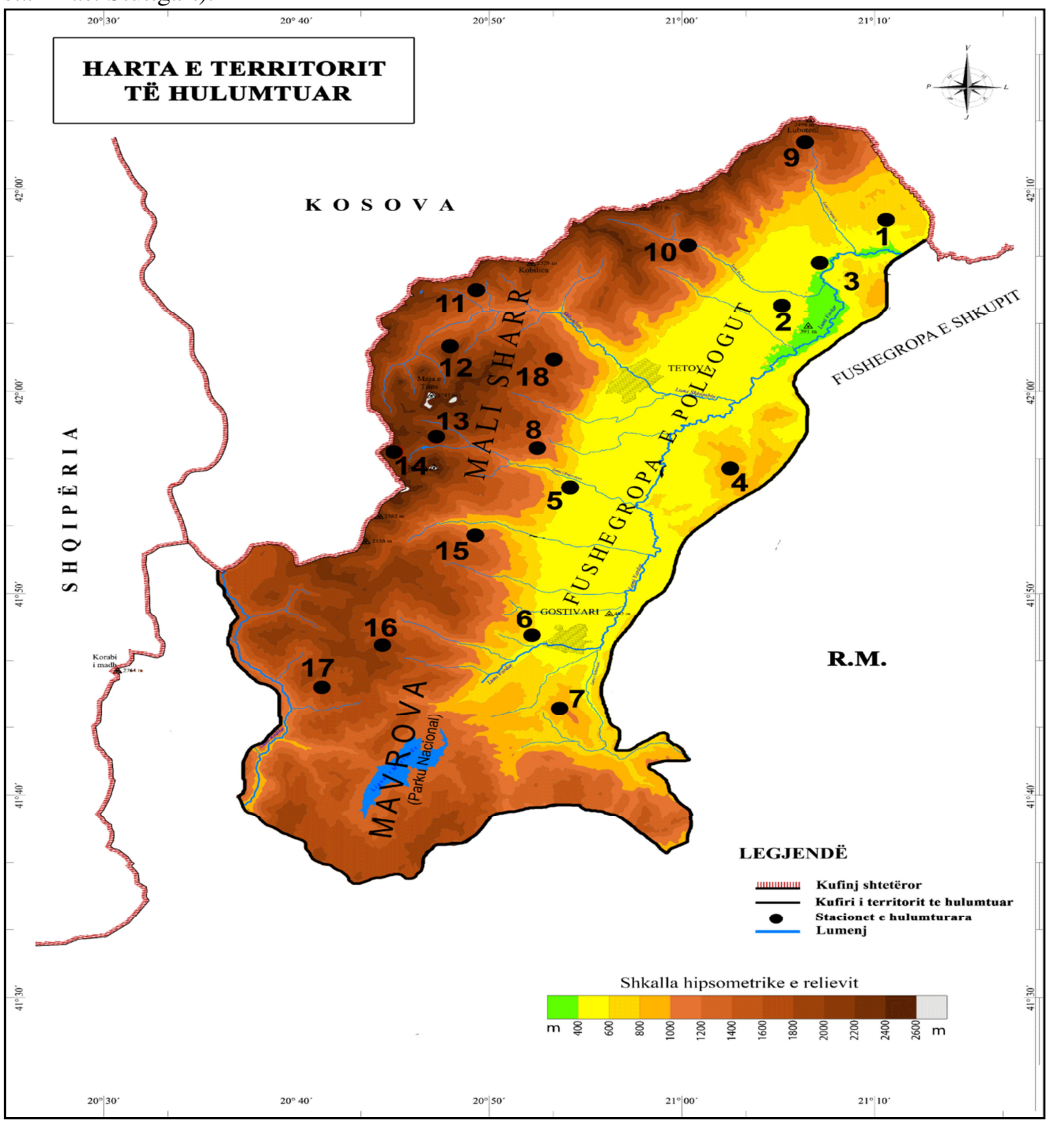

Fig 1. The explored territory (Sharr Mountain, Pollog Valley and Mavrovo National Park) within the Republic of Macedonia.

With numbers from 1-18 and the black dots are evidenced stations (locations) within the mapped territory: 1. Jazhincë, 2. Përshevcë-Jegunovc, 3. Nerashtë, 4. Radiovc, 5. Pirok, 6. Raven, 7. Llakovicë, 8. Kamenjan, 9. Luboten, 10. Tearcë-Jelloshnik, 11. Brodec-Veshall, 12. Popova Shapka (Kodra e Diellit), 13. Rakovec-Bistravec, 14. Liqeni i Zi, 15. Negotinë-Llomnicë, 16. Mavrovë-Radikë, 17. Mavrovë-Bistra 18. Lisec.

Fig 1. The explored territory (Sharr Mountain, Pollog Valley and Mavrovo National Park) within the Republic of Macedonia.

Tab. Nr.1. Species found from the Family Hesperiidae within the explored territory

Nr	*Family*	*Genus*	*Species*	*Data*	*Latitude*	*Longitude*	*Altitude*	*Location*
1.	Hesperiidae (Latreille,1809)	Pyrgus (Hubner, 1801)	Pyrgus malvae L.	02.06.2011	N 410 54' 31.15"	E 200 52' 68.98"	610 m	Pirok (Sar Mountain)
2.	Hesperiidae	-	Pyrgus armoricanus Oberth.	02.06.2012	N 410 52' 41.66"	E 200 52' 18.42"	728 m	Negotino-Llomnicë
3.	Hesperiidae	-	Pyrgus sidae Esper	09.06.2013	N 42^0 05' 47.10"	E 21^0 08' 02.41"	448m	Nerasht (Pollog Hollow)
4.	Hesperiidae	-	Pyrgus alveus Hüb.	06.07.2013	N 42^0 00'47.20"	E 20^0 55' 57.96"	1149 m	Lisec (Sar Mountain)
5.	Hesperiidae	-	Pyrgus serratulae Ramb.	10.08.2012	N 41^0 52' 41.66"	E 20^0 52' 18.42"	728 m	Negotino
6.	Hesperiidae	-	Pyrgus andromedae Wallengr.	17.07.2013	N 41^0 47' 42.65"	E 20^0 48' 24.79"	1679 m	Bistravec (Sharr Mountain)
7.	Hesperiidae	-	Pyrgus carthami Hüb.	30.06.2012	N 41^0 57' 35.14"	E 20^0 53' 45.32"	620 m	Kamenjan (Sharr Mountain)
8.	Hesperiidae	-	Pyrgus cinarea Ramb.	26.06.2012	N 42^0 07' 43.03"	E 21^0 12' 13.20"	710 m	Jazhinco (Pollog Valley)
9.	Hesperiidae	Spialia (Swinhoe,1912)	Spialia phlomidis H & Sch.	25.08.2013	N 42^0 08' 66.15"	E 21^0 07' 67.72"	668m	Jazhinco (Pollog Valley)
10	Hesperiidae	-	Spialia orbifer Hüb.	30.06.2012	N 41^0 44' 46.82"	E 20^0 55' 29.69"	620m	Llakovic (Pollog Valley)
11	Hesperiidae	Carcharodus, (Hübner, 1819)	Carcharodus alceae Esp.	19.08.2011	N 410 54' 31.15"	E 200 52' 68.98"	610 m	Pirok (Sharr Mountain)
12	Hesperiidae	-	Carcharodus flocciferus Zeller	20.06.2012	N 41^0 42' 06.98"	E 20^0 45' 26.05"	1011 m	Mavrovo (Radiko)
13	Hesperiidae	Erynnis (Schrank, 1801)	Erynnis tages L.	25.08.2012	N 42^0 05' 41.58"	E 21^0 02'40.68	679m	Tearco (Sharr Mountain)
14	Hesperiidae	Thymelicus (Hübner, 1819)	Thymelicus lineola Ochs.	10.06.2012	N 41^0 52' 07.84"	E 20^0 58' 56.98"	510 m	Radiovc (Pollog Valley)
15	Hesperiidae	-	Thymelicus sylvestris Poda	22.06.2013	N 41^0 42' 06.98"	E 20^0 45' 26.05"	1011 m	Mavrovo (Radika)
16	Hesperiidae	-	Thymelicus acteon Rottemb.	19.07.2013	N 42^0 05' 47.10"	E 21^0 08' 02.41"	448m	Nerasht (Pollog Valley)
17	Hesperiidae	Hesperia (Fabricius,1793)	Hesperia comma L.	15.08.2012	N 41^0 59' 52.63"	N 41^0 59' 52.63"	1679 m	Kodra e Diellit (Popova Shapka)
18	Hesperiidae	Ochlodes (Scudder, 1872)	Ochlodes sylvanus Esp.	07,07.2012	N 41^0 54' 31.15"	E 20^0 52' 68.98"	610 m	Pirok (Sharr Mountain)

Results and Discussions

The results of our research are presented in Table 1 in which are given all information: family, genus, type, date,

altitude, geographic length and width of these localities. From the Tab. 1 it can be seen that our research has resulted from the determination of 18 species of Hesperiidae family that belong to 7 genuses within Rhopalocera sub-order. As compared with the published data for Sharr Mountain, researchers: Dr. Austrian Rebel & Dr. Hans. Zerny [14] have described only four species of Hesperiidae family in this respective territory. But Josef Thurner [18] has found 24 species in the Republic of Macedonia, while only 13 species belong to the Hesperiidae family in Sharri Mountain. Referred to the later information from the researcher Melovski D., [5] who made an exploration during 1995-1998 and 2000 in Sharr Mountain proves that from all 102 Rhopalocera species, 7 species belong to the Hesperidia family.

Detailed research about Sharr Mountain was done by Jaksic P., Scheider P., [15] during the years (1986,1988,1998), but we should have in mind that this provides only data from the Sharr Mountain in genereal (Macedonia and Kosovo Section) and reports of 147 Rhopalocerave species, where 19 of these species belong to the Hesperiidae family.

If we refer to publications of Krpach & Mihailova, 1997; Micevski & Micevski, 2003[10] in the territory of the Republic Macedonia so far there are found only 25 species of Hesperiidae family.

If we make a comparison between the researched territory and the total territory of the Republic of Macedonia, we can conclude that this territory is very rich and possesses a lot of Rhopalocera types, and this is enabled from the diversity of habitats that this territory owns, even though in the aspect of the surface it includes only 1/10 or in percentage it is 9.4% from the total territory of the Republic of Macedonia. Thus, if we calculate the presence of Hesperiidae within the territory of the Republic of Macedonia, 72.0% from the general number are present in this territory.

These findings clearly show that the percentage of the present species speakes to a significant number of Hesperiidae family and which is expressed with a higher percentage compared to other territories explored in the Republic of Macedonia.

Conclusion

Our research is focused on the Ropalocerofauna of the massif mountain of Sharr, Pollog Valley and Mavrovo National Park and it can be considered as one of the most valuable research because it determines a percentage of the Hesperiidae family in this territory (18 species or expressed in percentage are 72% from the species of this family that are found in this territory). Therefore, we conclude that this group has a specific research character. The research has been focused on the possibility of the presence of the exact number of family Hesperiidae and seeking to find new species or eventual extinction of any species for the territory in research. It is disturbing the fact that during this research are not met anywhere the species Erynnis marloi B.[1] Our research is focused on exploration dove with over 500 copies of the Hesperiidae family, in different habitats in 18 research stations, at different altitude, longitude coordinates and certain geographic latitude. Our research will give more information about the study area, and the presence of the correct Rhopalocera species of Hesperiiidae family within the territory explored.

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[1] *Target; **IUCN List Category, Near Threatened (NT), *Target, **NT, ***C2a Berne Convention annex II; *****Habitat Directive annexes II/IV; endemic, CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora).

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